Neonates Exposed to Opioids in Vermont
Vermont Uniform Hospital Discharge Data Set

Background

Vermont has the second highest rate of admissions to state-funded substance abuse treatment programs in the U.S. This unprecedented access to care in Vermont reflects a culture of treating addiction as a chronic disease. In the past decade, as the prescribing of buprenorphine has grown and the first methadone clinic opened in 2004, access to medication assisted therapy (MAT) to treat opioid dependence has dramatically increased. In 2012, the State of Vermont initiated the Care Alliance for Opioid Addiction—a statewide partnership of clinicians and treatment centers to provide MAT to Vermonters addicted to opioids.

Treating Pregnant Women

Pregnant women are a critical population of adults dependent on opioids. The American College of Obstetricians and Gynecologists recommends that all pregnant women with opioid dependence be in active treatment, including the use of MAT. Since 2002, Vermont hospitals have worked with pregnant women who are opioid dependent and their infants who are exposed to opioids in utero. Both provider awareness of opioid dependence during pregnancy and increased training in the treatment of infants exposed to opioids have changed dramatically in Vermont over the past decade. Initiatives such as the Improving Care for Opioid-exposed Newborns (ICON) project at the University of Vermont and Fletcher Allen Health Care have greatly expanded training and awareness in the Vermont provider community. As women have learned they will be treated with respect, and provider awareness and openness to treating women with opioid dependence have increased, so has the willingness of women to come forward and seek help.

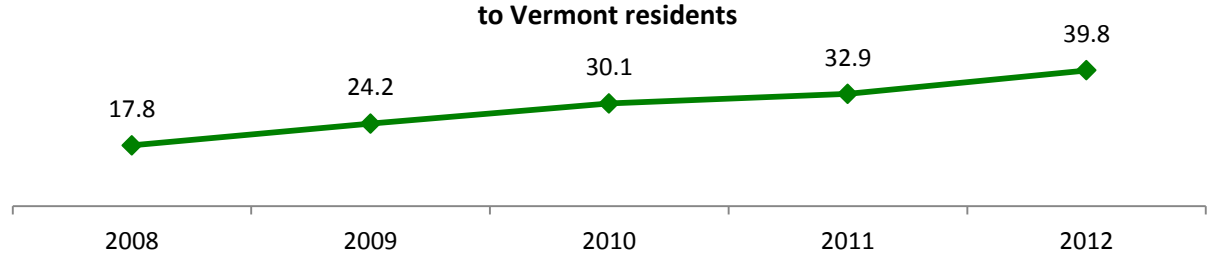
Infants Exposed to Opioids

In Vermont, the vast majority of opioid dependent pregnant women are in treatment.[1] Once a pregnant women is identified as opioid dependent, her infant is diagnosed as "exposed to opioids" with a diagnosis code for neonatal abstinence syndrome (NAS). Opioid-exposed infants are monitored for four days in the hospital. Many of these infants never show symptoms of NAS. While some do have signs and symptoms of NAS, only a small proportion of those need to be treated with methadone or morphine.

Trend Over Time

According to the Kid's Inpatient Database (a national sample of hospital discharges), the U.S. average rate of NAS in 2009 was 3.4 infants per 1,000 hospital deliveries.[2] Comparing this directly to the 24.6 per 1,000 deliveries in Vermont might lead one to think that Vermont's rate is seven times higher. However, because Vermont is a leader in treating opioid dependent pregnant women, provider awareness and access to care might be plausible explanations for the disparity. In addition, the Vermont practice of coding all opioid exposed infants with the NAS diagnosis code could contribute to the difference. The increase in the Vermont rate of opioid exposed infants from 2008 to 2012 can partially be attributed to the increase in provider awareness and the increased access to treatment.

Figure 1. Rate of infants exposed to opioids per 1,000 Vermont hospital deliveries to Vermont residents



Source: Vermont Uniform Hospital Discharge Data Set, 2008-2012. Cases had any diagnosis code of 779.5 or 760.72, based on the ICD-9-CM.

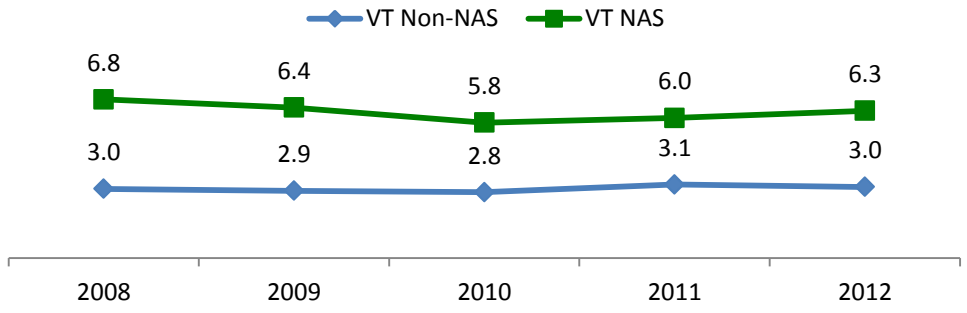
Cost Over Time

Though charges do not directly indicate costs or payments, they do serve as an appropriate surrogate measure to examine in discharge data. Vermont hospital charges for infants exposed to opioids have not significantly changed in the last five years ($9,444 in 2008 and $11,127 in 2012 per infant). In 2009, the average U.S. hospital charge for an infant diagnosed with NAS was $53,400,[2] compared to only $9,866 per opioid exposed infant in Vermont. It is important to recognize that while the rate of diagnosis is higher in Vermont, the charge per infant associated with treating those infants is much lower. As previously stated, only a small proportion of infants diagnosed need treatment.

Length of Stay

The average length of stay (LOS) for an infant exposed to opioids has not significantly changed in the last 5 years (Figure 2). In 2009, the average length of stay for an infant diagnosed with NAS in U.S. hospitals was 16 days,[2] compared to only 6.4 days in Vermont. The Vermont average LOS for an infant not diagnosed with NAS is 3 days, which is the same as the national average.[2]

Figure 2. Average length of stay post-delivery infants, by opioid exposure status, for Vermont residents at Vermont hospitals



Source: Vermont Uniform Hospital Discharge Data Set, 2008-2012. Included cases with any diagnosis code of 779.5 or 760.72, based on the ICD-9-CM.

Conclusion

Both the increase in the rate of opioid exposed infants and the discrepancy with the national data can be explained by the increased awareness of providers, improved access to opioid addiction treatment, and an increase in the number of women who are willing to come forward. While the Vermont rate is higher than the U.S. average, Vermont has one of the leading treatment models in the U.S., and length of stay for infants is 40% of the U.S. average and costs in Vermont are 20% of the U.S average.

Analysis Methodology

All data analysis was performed on the Vermont Uniform Hospital Discharge Data Set (VUHDDS), which provides data for individual discharges. Though it is unlikely in this analysis, the nature of this data set allows for an individual to appear multiple times as each data point represents a discharge rather than an individual (transfers were excluded). Analyses were limited to discharges of live born (MDC code of 15) Vermont residents at Vermont hospitals. Data were limited to Vermont residents at Vermont hospitals because data for 2010-2012 are not yet available from bordering states. Opioid exposed infants were identified by any mention of ICD-9 CM Diagnosis code 779.5 or 760.72. We excluded cases of iatrogenic NAS (ICD-9 CM 772.1x, 779.7, 777.5x, 777.6, 770.7) as well as live born NAS infants with birth weights less than 1500 grams.

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References

[1]Vermont Medicaid Claims data analysis and Vermont Vital Records data analysis show that four out of five infants with ICD-9 codes for 779.5 or 760.72 were born to women in treatment.

[2] Patrick S, Schumacher R, Benneyworth B, Krans E, McAllister J, Davis M. Neonatal Abstinence Syndrome and Associated Health Care Expenditures. *JAMA.* 2012;307(18):1934-1940.